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Turkish adaptation and psychometric testing of the caring assessment tool-administration

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Abstract

Purpose: The purpose of this study was to adapt the Caring Assessment Tool-Administration (CAT-Adm) to Turkish and to test the psychometric properties.

Design and Methods: The study was carried out in a cross-sectional and methodological design. The sample consisted of 578 nurses.

Findings: The total score correlation coefficients of the items in the scale ranged from 0.69 to 0.90, and the Cronbach alpha reliability coefficient was 0.98, indicating excellent reliability. The results of the factor analysis confirmed the single-factor structure of CAT-Adm and the scale fit was good.

Conculation: In this study, CAT-Adm was determined to be a reliable and valid tool.

Practice Implications: With the use of CAT-Adm, nurses' perceptions of nurse managers' approach can be evaluated.

KEYWORDS

Caring Assessment Tool-Administration, caring behavior, nurse manager, psychometric properties

1 | INTRODUCTION AND BACKGROUND

Worldwide, the complexity, chaotic structure and rapid change of health systems result in the need for restructuring. During the restructuring process, uncertainties that adversely affect work environment may lead to financial needs being prioritized and employees' needs overlooked. These changes in the health system also have an impact on the work environment of nursing, and the expectation of better care with limited resources results in pressure from the management.[1,2] In this context, nurse managers' approach to nurses play an important role in establishing relationships that support a healthy work environment.[3,4] Positive management behaviors perceived by nurses contribute to positive outcomes for patients, nurses, and the health system.[5,6] To make evaluations and improvements in this regard, there is a need for measurement tools to determine staff nurses' perceptions of nurse managers' caring behaviors.

In the literature, there are two scales that evaluate nurse manager's approaches based on the theory of human caring (THC).[7] One of these scales, "Caring Factor Survey-Caring of Manager (CFS-CM)" was developed by Nelson in 2012 based on 10 Caritas Processes defined in Watson's THC.[8] However, this scale has not been published and has been used in similar studies with permission from the developers.[9] Another scale developed by Duffy in 1997 is the Caring Assessment Tool-Administration (CAT-Adm). The 94-item scale was integrated into Watson's THC-based quality care model and was designed to measure how nurses perceived their managers' behavior. In the study conducted by Duffy in 2008, the number of items in CAT-Adm was reduced to 39.[10] Wolverton et al.[11] carried out a new abbreviation study to facilitate the completion of CAT-Adm and further reduced the number of items to 25. The Cronbach alpha (α) coefficient of CAT-Adm is 0.98, and it consists of a single factor called care behaviors. CAT-Adm has not yet been translated into any language other than English. The scale was used in two studies from the United States to evaluate the relationship between nurses' perception of nurse manager's caring behaviors and patient experience[12] and to measure nurse manager's support on the well-being of nurses during COVID 19.[13]

These two measurement tools developed to measure nurses' perceptions of nurse managers' caring behaviors have been previously evaluated in terms of content and psychometric properties. According to the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) directive, when making a choice between the two scales, the scope, structure, criterion-related and cross-cultural validity, internal consistency, measurement error, hypothesis testing, and responsiveness are assessed.[14] In the current study, considering that CAT-Adm uses Watson's quality care model based on THC, we decided to adapt this scale to Turkish for reasons such as the instrument focusing on nurse managers' caring behaviors, being more up-to-date and easier to interpret, having higher reliability, and availability of factor analysis data in the literature. The aim of this study was to adapt the CAT-Adm to Turkish and to test the psychometric properties.

2 | METHODS

2.1 | Study design

This cross-sectional and methodological study was carried out in two stages: Stage 1 comprised the determination of psycholinguistic features and language adaptation of CAT-Adm and Stage 2 consisted of the psychometric testing of CAT-Adm. Data were collected between September 2019 and October 2019.

2.2 | Participants and settings

The sample of the study consisted of nurses from three university hospitals, who had been working in their current institution for at least 6 months and agreed to participate in the study. To test the validity and reliability of a scale, it is suggested that the sample size should be 10 times the number of items in that scale.[15,16] It is also recommended that ideally 300–500 participants should be included in the sample to reveal the factor structure of a scale.[15,17] Considering that there could be incomplete or incorrect responses resulting in data loss, we reached a total of 643 nurses, of whom 26 refused to participate in the study, nine had been working in their current institution for less than 6 months, and one had missing data (n = 607). Furthermore, when examining the suitability of the dataset for the factor analysis, 29 extreme values were removed from the dataset (n = 578). Of the remaining data, 294 were used to conduct the explanatory factor analysis (EFA) and 284 to perform the confirmatory factor analysis (CFA) and examine the reliability properties.

To analyze the invariance of the scale over time, data were collected again from 55 nurses included in the initial sample using the same method at intervals of 2–4 weeks.

2.3 | Data collection

The descriptive characteristics form and the CAT-Adm survey were delivered by the researchers to nurses in a closed envelope during a face-to-face interview, and the completed forms were collected within 2 days.

2.4 | Descriptive characteristics form

This form contains seven questions inquiring about the demographic and descriptive characteristics of nurses.

2.5 | CAT-Adm

CAT-Adm developed by Duffy in 1997[18] and modified by Wolverton et al.[11] consists of 25 items and one factor called caring behaviors. According to the 5-point Likert type (1 = *never*…5 = *always*), the total score obtained from the scale varies between 25 and 125. If the total score is 75 or above (corresponding to a score of 3 or higher in each item), this shows that the nurses' perception of nurse managers' caring behaviors are positive.

3 | PROCESS OF TRANSLATION AND ADAPTATION OF CAT-ADM

3.1 | Analysis of psycholinguistic properties and language adaptation

In language adaptation, scale items are translated into the target language, providing measurement equivalence and an understandable language structure.[15,19] In this context, the translation and cultural adaptation process for measurement tools developed in different languages is undertaken following certain guiding principles.[15,20] The translation and cultural adaptation process of CAT-Adm was carried out with the following stages:

(a) For the examination of the psycholinguistic properties of CAT-Adm, it was translated and reported from English to Turkish by three experts who are fluent in both languages.

(b) Translation and reports were evaluated and synthesized, and the Turkish form of the scale was created.

(c) The Turkish scale was translated into English and reported by two independent experts, whose native language is English. The equivalence of the scale was approved by consensus between both researchers and translators.

(d) Opinions of nine experts were taken on the language and content validity of the scale items, and the final version of the scale was prepared after being approved by the translators.

(e) A pilot study was conducted with 10 nurses with similar characteristics to the nurses included in this study. The final Turkish form of the scale was created as a result of evaluating the feedback

regarding the readability, understandability, clarity and significance of the expressions in the scale.

3.2 | Analysis of psychometric properties

The psychometric properties of CAT-Adm were examined based on guiding principles and using various psychometric test methods. The content validity of the CAT-Adm items were evaluated using the Davis technique. During this process, the opinions of a total of 13 experts were obtained. The Content Validity Index (CVI) was calculated for each item in the scale. If this value is 0.90 or higher, the item is considered to be adequate in terms of content validity.[15,21] In our study, it was determined that each item had a CVI value of 0.92–1. In line with these results, CAT-Adm was considered to be suitable for Turkish culture, represented the population to be measured, and had acceptable content validity.[15,21]

4 | DATA ANALYSIS

SPSS 24 and LISREL 8.72 package programs were used to analyze the data obtained from the research. The psychological structure measured in different languages-cultures and groups may vary. Therefore, in adaptation studies, it is recommended to start with EFA to reveal the most suitable and healthy structure for the target culture and group. After the structure of an adapted scale is revealed, the validity and reliability characteristics of the scale should be evaluated with a new sample.[22] In this study, the sample was randomly divided into two to test construct validity: EFA was applied to the first dataset and CFA was applied to the second dataset.

To assess whether the data are suitable for factor analysis, Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests were conducted, the normality test (kurtosis and skewness values) was undertaken, and missing and extreme values were evaluated. For a good factor analysis, the KMO measure is expected to be more than 0.80. Alternative fit indices were taken into consideration in CFA.[23,24]

In the reliability analysis of CAT-Adm, Cronbach's alpha reliability coefficient and item-total score analysis were used to measure internal consistency, and the test-retest method was employed to check the measurement invariance of the scale over time.[22] Intra class correlation coefficient (ICC) analysis was performed to determine test-retest reliability.[25]

4.1 | Ethical considerations

Written permission was obtained from Cheryl Lynn Wolverton for the adaptation of CAT-Adm to Turkish and the use of the adapted version. Ethical permission was received from the Ethics Committee of the Dokuz Eylül University (2019/03-30), and written institutional permission was obtained from the administrations of the three hospitals where the study was to be conducted. The nurses were informed that participation in the study was on a voluntary basis and their personal information would be kept confidential.

5 | RESULTS

The mean age of the nurses in this study was 35.04 ± 7.55 (min: 20–max: 62) years, 90.8% of them were female, 69.7% were undergraduates, and 56.3% worked in clinical departments. The mean duration of the participants practicing the nursing profession was 13.17 ± 8.16 (min: 11 months-max: 37 years) years, and the mean duration of working in the current institution was 7.43 ± 6.56 (min: 6 months-max: 31 years) years.

5.1 | Validity

For the factor analysis, the skewness and kurtosis values were examined as normality tests, and data loss and outliers were determined. The kurtosis values of the variables were between −0.399 and −1.363, the skewness values ranged from −0.74 to 1.605, with no missing data identified. Since all the items and the whole scale showed a normal distribution, it was considered to be suitable for the factor analysis.[24,26]

The KMO value measured to determine sampling adequacy was 0.98, indicating very good adequacy. Bartlett's test of sphericity, which is used to evaluate whether data are suitable for the factor analysis, was found to be highly significant at $\chi^2 = 9019.60$ ($p < 0.001$).

If the factor structure of a scale is known before starting the factor analysis, correlation matrices (item-item and anti-image) are examined separately for each factor to test the suitability of the dataset for such analysis.[24,26] This allows for the identification of unsuitable items before starting the analysis. Items with item correlations of less than 0.3 within the same factor or those found to be statistically nonsignificant are considered to be a problem, and therefore, they should be removed before starting the factor analysis. In addition, if the values in the diagonal of the anti-image correlation matrices are low (<0.50), the factor analysis is not continued with these items.[24,26] In the current study, when the item-item and anti-image correlations were examined, there were no problematic items. As a result, it was accepted that the dataset obtained from the administration of the scale was suitable for EFA to be performed with all items. First, EFA was applied to the dataset to evaluate the Turkish version of CAT-Adm and determine its factors ($n = 294$). The principal component analysis was used as a factoring technique in EFA. Since the factor number was found to be one in all cases, there was no need for rotation. It was determined that CAT-Adm consisted of one dimension with an eigenvalue of 18.007, which explained 72.026% of the total variance. The scale items had factor load values varying between 0.644 and 0.905 (Table 1).

CFA is a type of a simple structural equation model with the first goal of determining the fit parameters of data to a known structure.

TABLE 1 Item-total mean scores, factor loadings, and corrected item-total correlations for CAT-Adm ($n = 294$)

CAT-Adm items My nurse manager…	Mean ± *SD**	Factor loading	Corrected item-total correlation
1. Keeps me informed.	4.26 ± 0.89	0.644	0.621
2. Allows me to choose the best time to talk about my concerns.	3.96 ± 1.07	0.846	0.830
3. Openly shows concern for me.	3.98 ± 1.08	0.881	0.868
4. Asks me about how I like to do my work.	3.49 ± 1.29	0.778	0.760
5. Helps me deal with my bad feelings.	3.88 ± 1.17	0.854	0.840
6. Expresses human emotions when they are with me.	4.27 ± 0.96	0.829	0.811
7. Is patient with me even when I am difficult.	3.72 ± 1.23	0.848	0.833
8. Is interested in information I have to offer about the work	4.20 ± 0.93	0.779	0.760
9. Accepts what I say, even if it is negative.	3.44 ± 1.23	0.791	0.773
10. Is aware of my feelings.	3.80 ± 1.18	0.876	0.863
11. Helps me find solutions regarding my work problems.	4.01 ± 1.07	0.864	0.849
12. Asks me how I think my work is going.	3.83 ± 1.17	0.883	0.871
13. Asks me how I think about nursing/healthcare.	3.45 ± 1.25	0.847	0.834
14. Provides me with literature about my work.	3.67 ± 1.19	0.762	0.743
15. Checks with me to make sure I understand what is going on in the workplace.	3.71 ± 1.23	0.863	0.850
16. Makes sure my co-workers know what I need.	3.63 ± 1.19	0.897	0.887
17. Makes me feel safe.	3.78 ± 1.25	0.903	0.893
18. Helps me feel special.	3.60 ± 1.31	0.897	0.888
19. Keeps me challenged.	3.74 ± 1.25	0.880	0.868
20. Allows me time off to be with my family/friends.	3.74 ± 1.22	0.798	0782
21. Helps me achieve my work goals.	3.84 ± 1.17	0.896	0.886
22. Understands my unique situation.	3.90 ± 1.17	0.898	0.887
23. Is concerned about how I view things.	3.77 ± 1.23	0.905	0.895
24. Knows what is important to me.	3.68 ± 1.27	0.892	0.883
25. Acknowledges my inner feelings	3.35 ± 1.37	0.856	0.844
Eigenvalue	18.007		
Explained variance (%)	72.026		
CAT-Adm mean score	94.69 ± 24.92 (min: 29–max: 125)		
Cronbach α	0.98		
Composite reliability	0.985		
The average variance extracted	0.720		

Abbreviation: CAT-Adm, Caring Assessment Tool-Administration.

*SD: Standard Deviation.

TABLE 2 Goodness-of-fit indices of CAT-Adm

Goodness-of-fit indices	Acceptable level			CAT-Adm	CAT-Adm (after modification)	Result
	Poor	Acceptable	Excellent			
χ^2/df	>5	>3	>1	1337.31/275 = 4.9	854.78/269 = 3.1	Acceptable
RMSEA	>0.08	>0.06	<0.06	0.11	0.088	Acceptable
CFI	<0.90	>0.90	>0.95	0.98	0.99	Excellent
NNFI	<0.90	>0.90	>0.95	0.98	0.99	Excellent
NFI	<0.90	>0.90	>0.95	0.98	0.98	Excellent
SRMR	>0.10	>0.08	<0.08	0.04	0.03	Excellent
GFI	<0.90	<0.90	>0.95	0.76	0.81	Poor

Abbreviations: CAT-Adm, Caring Assessment Tool-Administration; CFI, confirmatory fit index; GFI, goodness of fit index; NFI, normed fit index; NNFI, nonnormed fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

In the case that the model is found fit for data, parameters provided by the model are considered to accurately describe the attributes of the scale.[24] To verify the single-factor structure, we evaluated the goodness-of-fit indices of χ^2/df, root mean square error of approximation (RMSEA), confirmatory fit index (CFI), nonnormed fit index (NNFI), normed fit index (NFI), standardized root mean square residual (SRMR), and goodness of fit index (GFI) during CFA.[16] In the current study, all factor loadings were at the 0.01 level, and the *t* values were found to be greater than 2.56 and statistically significant.

According to the results of the first CFA analysis ($\chi^2/df = 4.9$, RMSEA = 0.11, CFI = 0.98, NNFI = 0.98, NFI = 0.98, SRMR = 0.04, and GFI = 0.76), two indices (RMSEA and GFI) did not provide an acceptable level of fit; therefore, the model had to be corrected. It is suggested that the correction proposals of the LISREL program should be evaluated and have a theoretical basis.[16,24] Solution proposals provided by the program for the improvement of the model were theoretically evaluated by the researchers, and it was deemed appropriate to define the relationships between the error variances of the items and six modifications were made. The acceptable levels of fit indices in CFA and the analysis results before and after modification are given in Table 2.

As a result of the modifications, the χ^2 value decreased from 1137.31 to 854.78. The χ^2/df (3.1) and RMSEA (0.088) values were determined to have an acceptable fit; CFI (0.99), NNFI (0.99), NFI (0.98) and SRMR (0.03) had an excellent fit; and GFI (0.81) had a poor fit (Table 2). Analytical equations and conceptually validated model diagram of CAT-Adm are shown in Figure 1.

5.2 | Reliability

To determine the internal consistency reliability of the scale, Cronbach's alpha value, corrected item-total correlation values, and Cronbach's alpha values obtained when the items were removed from the scale were calculated. In addition to determining composite reliability for construct reliability and factor load values for convergent validity using CFA, it is suggested that the average variance extracted (AVE) value should also be calculated.[26,27] In the reliability analysis of the Turkish version of CAT-Adm, Cronbach's alpha coefficient was determined as 0.98. Since this value was greater than the acceptable value, the scale was considered to be reliable.[26] The lowest item average was 3.35 ± 1.37 obtained from item 25 and the highest was 4.27 ± 0.96 belonging to item 6 (Table 1).

Item-total score correlation shows the relationship of each item with the total scale and their individual weight. A high correlation obtained for each item indicates that the correlation of that item with the measured theoretical structure is also high; that is, the item is effective and adequate in measuring the intended behavior. In the current study, corrected item-total correlations were examined for the 25 items of CAT-Adm, and the results are given in Table 1. It was observed that the corrected item correlations of CAT-Adm had values varying between 0.621 and 0.895, and removing any item from the measurement tool did not change the internal consistency reliability of the scale. In addition, the composite reliability value was 0.985 and the AVE value was 0.720. In the test-retest analysis conducted to evaluate the invariance of CAT-Adm over time, the ICC score was calculated as 0.98 ($p < 0.001$).

6 | DISCUSSION

Considering the need for a measurement tool to determine nurses' perceptions of nurse managers' caring behaviors, in the current study, CAT-Adm, developed by Duffy[10] and modified by Wolverton et al.[11] was adapted to Turkish.

6.1 | Validity

In the research, suggestions included in the literature for adapting scales to different cultures were taken as basis during the translation

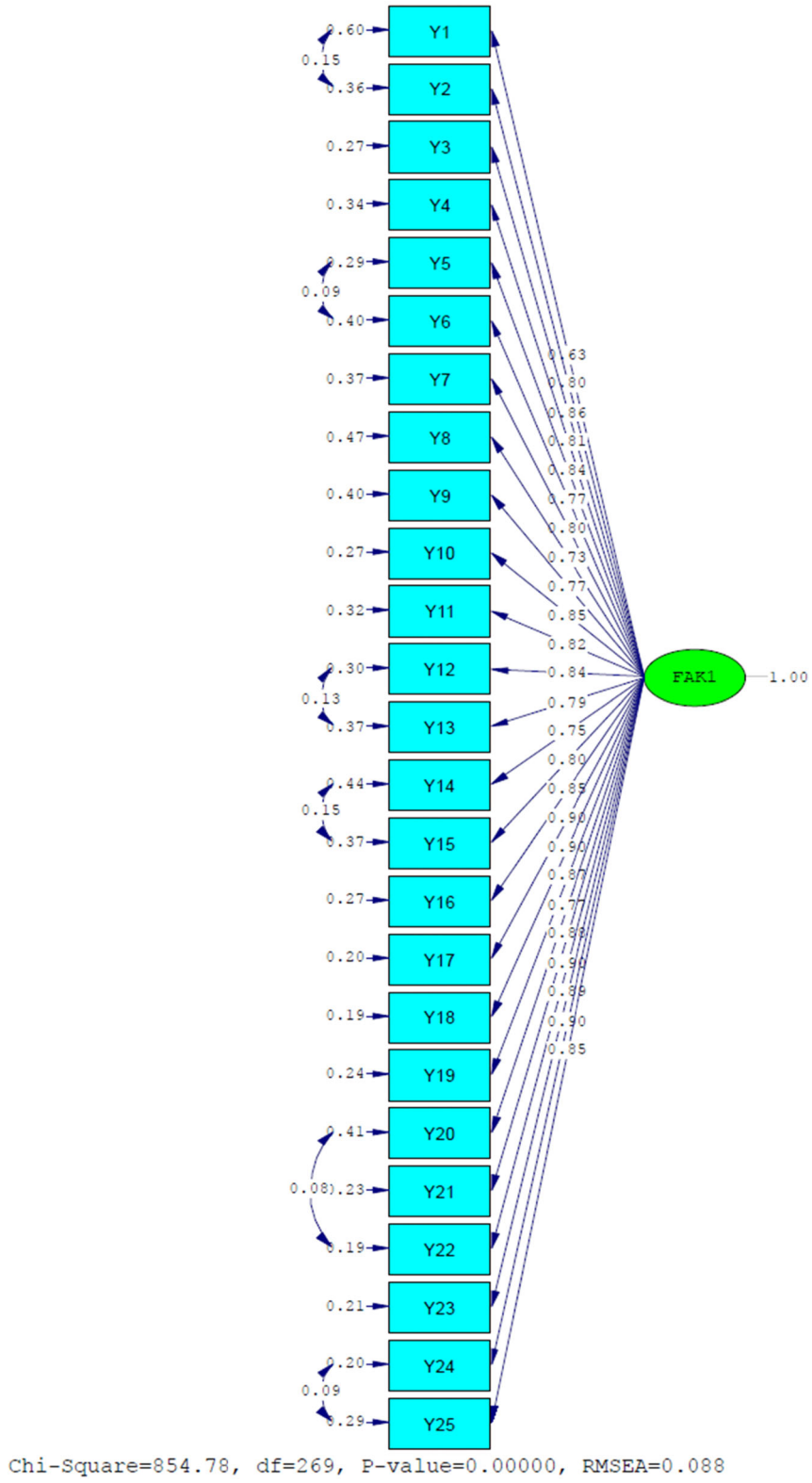

FIGURE 1 Path diagram for CAT-Adm. CAT-Adm, Caring Assessment Tool-Administration; RMSEA, root mean square error of approximation

and back-translation processes and to adapt the items into Turkish without losing their meaning in the original language and to ensure content validity.[15] CVI, which was performed to evaluate the agreement between expert opinions, showed a high level of agreement (>0.90 and above), and content validity was achieved.[15,21] As a result, it was concluded that the scale had an understandable language structure and content, and the items represented the properties that were intended to be measured.

Based on the results of EFA performed to determine the factor structure of the Turkish version of CAT-Adm, the 25-item and

single-factor scale structure provided the highest fit for the data. While the single-factor structure explained 65.45% of the total variance in the original scale, it explained 72.03% of the total variance in the adapted version, revealing that both versions were above the recommended percentage of 30% and above.[23,24] The factor loads of the scale items varies between 0.644 and 0.905, which is similar to the original scale (>0.60). In both scales, the single factor was determined to represent the conceptual structure.

As a result of the modifications made, the fit indices were found to be acceptable or excellent, confirming the validity of the single-factor model structure consisting of 25 items. The poor fit value of GFI was attributed to the decrease in this value as the number of items per factor increases, as suggested in the literature.[28]

6.2 | Reliability

Cronbach's alpha coefficient of CAT-Adm was above 0.98, showing very high internal consistency for the adapted scale.[26,29] The internal consistency coefficient of the adapted scale was found to be substantially similar to that of the original scale. However, Cronbach's alpha being greater than 0.90 indicates that some items measured the same property, and the scale should be abbreviated.[30] Therefore, it would be proper to further examine the items of the scale in next studies.

The test-retest correlation coefficient ICC, which shows the invariance of the scale over time, was determined to be 0.98, indicating a high correlation between the mean scores and measurement invariance over time.[25]

The corrected item correlations of CAT-Adm were above ≥0.60, indicating that the items in the scale had discriminative power and high internal consistency.[24] Similar to the original scale, the item-total score correlation of the adapted version showed the efficacy and adequacy of this tool in measuring nurses' perceptions of nurse managers' caring behaviors. In addition, the composite reliability and AVE values showed that internal consistency reliability and composite reliability were achieved. These results are indications that the scale can be used as a reliable measurement tool.

6.3 | Limitations

The first limitation of this study is that the sample consisted of nurses working only in university hospitals. Therefore, the adapted scale should be re-examined in terms of basic psychometric properties when administered in public and private hospitals and other healthcare institutions. Another limitation is that the qualifications and cultural characteristics of the health institution where the nurses worked may have affected their perceptions of their managers' behaviors. Therefore, when the scale is administered to nurses working in institutions that may have cultural differences, potentially effective factors should be taken into account in the interpretations of the results.

6.4 | Implications for nursing practice

With the use of the CAT-Adm, which is a valid and reliable tool, nurses' perceptions of nurse managers' approach can be evaluated. The effect of interventions such as “trainings,” and “care leadership development programs” aimed at improving caring behaviors to strengthening the relationship and communication between colleagues will be objectively measurable with CAT-Adm. In addition, the use of this scale can contribute to the development of communication and cooperation between nurse managers and nurses based on mutual respect, love and compassion. In this way, it can be contributed to the creation of a healthy working environment.

7 | CONCLUSION

In the current study, it was shown that CAT-Adm was a reliable and valid tool that could be used by managers and researchers to evaluate nurses' perceptions of nurse managers' caring behaviors. The single-factor scale consisting of 25 items is an easy instrument that can be administered in a short time. CAT-Adm will guide healthcare managers to improve the differences between departments and their management approach to nurses.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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